

PATENT APPLICATION

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**TOOL-LESS WALL-MOUNT
DISTRIBUTED FILTER HOUSING****CROSS REFERENCE TO RELATED APPLICATIONS**

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This application is a continuation-in-part of U.S. Design Application No. 29/127,805, filed August 11, 2000. This application claims the benefit of U.S. Provisional Application No. 60/224,705, filed August 11, 2000.

FIELD OF THE INVENTION

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The invention relates generally to a wall-mount housing for use at subscriber premises. More particularly, the invention is a wall-mount housing for a distributed filter to separate voice and data signals at a subscriber premises that does not require tools for installation.

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BACKGROUND OF THE INVENTION

High speed Internet access is becoming increasingly commonplace in commercial and residential telecommunications installations. One technology being used for high speed Internet access is commonly known as splitter-less asymmetrical

digital subscriber line ("Splitter-Less ADSL") or "G.Lite." However, several other forms of digital subscriber line ("DSL") services exist, collectively referred to as "xDSL," that may be able to utilize a housing constructed in accordance with the invention. Splitter-Less ADSL utilizes a low pass filter electrically insulated and physically protected within a housing. The present practice is to house the low pass filter within an indoor xDSL splitter assembly of the type disclosed in U.S. Patent 6,137,866 issued October 24, 2000 to Staber et al., which is assigned to the assignee of the present invention. Indoor xDSL splitter assemblies, however, typically require the use of a tool, such as a screwdriver, to install the assembly on a wall, ceiling or floor at subscriber premises. The use of a screwdriver to install the assembly is generally considered to be "non-subscriber-friendly," and thus, generally requires that a craftsperson be dispatched from the service provider, resulting in service delays and substantial expense.

Although an ADSL filter product that does not require a tool to install is available from EXCELSUS™ Technologies, Inc. of Carlsbad, California, under the trade name Z-BLOCKER™, that product does not provide the installer with adequate viewing of the alignment of the housing during the installation process. The housing of the Z-BLOCKER™ filter mounts to the mounting studs of a wall plate between the wall plate and a conventional wall-mount telephone. The housing is provided with elongated slots formed in the rear surface that receive the mounting studs of the wall plate to removably attach the housing to the wall plate. Enlarged portions of the slots are positioned over the mounting studs and the housing is moved downwardly until the mounting studs are securely retained within the slots. The alignment of the

enlarged portions of the slots with the mounting studs, however, is not readily visible during the installation of the housing on the wall plate. Accordingly, it is possible that the housing will not be securely retained on the mounting studs and will detach from the wall plate when the telephone is mounted on the housing, thereby possibly
5 damaging the filter and/or electrical connections within the housing or the telephone if the housing and the telephone fall from the wall plate onto a hard surface. In addition, the Z-BLOCKER™ filter includes a phone plug that is rigidly fixed to the rear surface of the housing, and thus, cannot accommodate a recessed or flush-mounted type wall jack.

10 In view of the noted deficiencies in the prior art, it is apparent that a need exists for a wall-mount housing for a high-speed Internet access product that is subscriber friendly. A more particular need exists for a wall-mount housing for a distributed filter to separate voice and data signals at a subscriber premises that does not require a tool to install the housing on a wall plate. It is further apparent that such
15 a wall-mount housing is needed that provides the installer or subscriber with adequate viewing of the alignment of the housing during the installation process.

SUMMARY OF THE INVENTION

The above objectives and advantages, as well as others, are realized and
20 attained by the wall-mount housing of the present invention. Additional features and advantages of the invention will be set forth in the written description that follows, as well as the accompanying drawings, or will be readily apparent from the description, or may be learned by practice of the invention.

In a particular embodiment, the present invention is a wall-mount housing for a distributed filter that is removably attached to a wall plate without the use of a tool. The housing is mounted to a wall plate having at least one mounting stud protruding outwardly therefrom. The housing includes a base having a slot formed therein for receiving the mounting stud of the wall plate to removably mount the housing to the wall plate. The housing also includes a cover overlying the base and attached thereto so that the cover and the base define a cavity therebetween. The housing further includes a filter circuit disposed within the cavity and a phone jack disposed within the cavity that is accessible through the cover. At least one auxiliary jack is also disposed within the cavity and accessible through the cover. The housing further includes a line cord with at least one wire pair electrically connected to the phone jack and the auxiliary jack.

Preferably, the cover has at least one mounting stud protruding outwardly therefrom for removably mounting a wall-mount telephone to the housing. The at least one auxiliary jack preferably includes a secondary phone jack and a DSL jack. The filter circuit delivers a filtered voice signal to at least one of the phone jack, the secondary phone jack and the DSL jack. The line cord has a phone plug attached at one end and a portion of the line cord and the phone plug extend outwardly through an opening formed in the base of the housing. The phone plug is electrically connected to a phone jack on the wall plate and the phone jack of the housing is electrically connected to the wall-mount telephone. The filter circuit may be disposed on a printed circuit board and the line cord may be electrically connected directly to the printed circuit board. Alternatively, the housing may further include a plurality of

wire terminating devices selected from the group consisting of screw terminals, insulation displacement contacts (IDCs”) and solder points for electrically connecting the line cord, the filter circuit, the phone jack and the at least one auxiliary jack.

The housing may also include at least one viewing window for viewing the mounting stud of the wall plate while the housing is mounted to the wall plate. In a particular embodiment, the at least one mounting stud of the wall plate includes an upper mounting stud and a lower mounting stud. The at least one viewing window of the cover includes an upper window for viewing the upper mounting stud of the wall plate and a lower window for viewing the lower mounting stud of the wall plate.

Furthermore, the slot of the base includes an upper slot and a lower slot for receiving the upper mounting stud and the lower mounting stud, respectively, of the wall plate. The line cord is provided with at least one wire pair, but is preferably provided with two wire pairs so that the housing may be configured for a first telephone line and a second telephone line. In a particular embodiment, the filter circuit delivers a filtered voice signal to at least one of the first telephone line and the second telephone line. In another particular embodiment, the filter circuit delivers a filtered voice signal to both the first telephone line and the second telephone line.

The housing may also include a locking mechanism disposed within the cavity that is movable between an unlocked position and a locked position to secure the housing to the wall plate without the use of a tool. In a particular embodiment, the locking means includes a slide lock having a grip portion adjacent one end and a stop portion adjacent the other end. The stop portion does not obstruct the slot of the base in the unlocked position, but does obstruct the slot of the base in the locked position.

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The grip portion extends outwardly from the housing in the unlocked position and is substantially flush with the housing in the locked position. The slide lock has a recess formed therein. The locking mechanism further includes a pair of opposed guide ribs extending inwardly from one of the base and the cover for guiding the stop portion, and a retaining rib extending inwardly from the other of the base and the cover into the recess to retain the stop portion between the guide ribs. In another particular embodiment, the locking mechanism includes a push-button lock having an actuating portion adjacent one end and a stop portion adjacent the other end. The stop portion does not obstruct the slot of the base in the unlocked position, but does obstruct the slot of the base in the locked position. The actuating portion extends outwardly from the housing in the unlocked position and is substantially flush with the housing in the locked position. The locking mechanism further includes a pair of opposed retaining clips extending inwardly from the base, and the stop portion has a pair of opposed retaining posts for engaging the retaining clips to retain the stop portion in the locked position.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate various embodiments of the invention, and, together with the description, serve to explain the principles and objectives of the invention. More specifically:

FIG. 1 is an exploded perspective view illustrating a housing according to the invention removably mounted between a wall plate and a wall-mount telephone;

FIG. 2 is an exploded perspective view of the housing of FIG.1;

FIG. 3 is a plan view showing the rear of the housing of FIG. 1;

FIG. 4 is an elevation view showing the side of the housing of FIG. 1;

FIG. 5 is a plan view showing the inner surface of the cover of the housing of

5 FIG. 1;

FIG. 6 is a plan view showing the front of the housing of FIG. 1 with the slide lock in the unlocked position;

FIG. 7 is a plan view showing the front of the housing of FIG. 1 with the slide lock in the locked position;

10 FIG. 8 is an exploded side view illustrating an alternative embodiment of a housing according to the invention removably mounted to a wall plate;

FIG. 9 is an exploded side view illustrating a wall-mount telephone removably mounted to the housing of FIG. 8 in a conventional manner;

FIG. 10 is a plan view showing the front of the housing of FIG. 8;

15 FIG. 11 is a plan view showing the rear of the housing of FIG. 8;

FIG. 12 is a plan view showing the inner surface of the base of the housing of FIG. 8;

FIG. 13 is a plan view showing the inner surface of the cover of the housing of FIG. 8; and

20 FIG. 14 is a series of exploded side views illustrating the sequence in which the housing of FIG. 8 is secured to the wall plate.

DETAILED DESCRIPTION OF THE INVENTION

One or more embodiments of the invention will be described hereinafter in sufficient detail to permit one of ordinary skill in the art to make, use and practice the invention without undue experimentation. The embodiments shown and described
 5 herein are exemplary only and are not intended to limit the scope of the invention, as defined by the appended claims, in any manner. Instead, the invention is intended to be construed broadly with reference to this detailed description and the accompanying drawings, in which like reference numerals indicate like parts in the various views.

FIG. 1 illustrates a housing **10** for a distributed filter constructed in accordance
 10 with the present invention removably mounted to a wall plate **12** between the wall plate **12** and a conventional wall-mount telephone **16**. The wall plate **12** comprises a pair of mounting studs **11** and a phone jack **13** centrally disposed on the wall plate **12** between the mounting studs **11**. The phone jack **13** is commonly referred to as a six
 15 position jack and may, for example, be a standard RJ-11 or RJ-14 style phone jack having a recess with at least a pair of contact wires disposed within the recess for transmitting voice and/or data communications. The wall plate **12** is commonly referred to as station apparatus. The telephone **16** comprises a complimentary RJ-11 or RJ-14 phone plug (not shown) with at least a pair of contact wires disposed thereon
 20 outwardly from the front surface **14** of the wall plate **12** so that the phone jack **13** may receive either a phone plug disposed on the rear surface of the telephone **16** or a line cord (not shown) having a phone plug attached thereto that extends outwardly from the telephone **16**. Accordingly, the telephone **16** may also be a conventional desk

type phone located remotely from the wall plate **12**. However, as will be understood and appreciated by those of ordinary skill in the art, the phone jack **13** may instead be recessed or flush-mounted with the front surface **14** of the wall plate **12**, in which case a telephone with a line cord is typically required.

5 The housing **10** is shown in greater detail in FIGS. 2-7. As shown and described herein, the housing **10** comprises a base **20** and a cover **40** attached to the base **20** such that the base **20** and the cover **40** define an internal cavity **30** therebetween. The base **20** and the cover **40** may be made of any suitable material, such as plastic or metal, and may be made of dissimilar materials. Preferably, however, the base **20** and the cover **40** are each made of a molded plastic material having sufficient strength and rigidity. The base **20** has a pair of internally threaded posts **22** and the cover **40** has a corresponding pair of holes **42** formed therethrough that receive externally threaded fasteners **60** to secure the cover **40** to the base **20**. However, the cover **40** may be secured to the base **20** in any suitable manner. The cover **40** may even be permanently secured to the base **20**, such as by ultrasonic welding, once the internal components are assembled and the necessary wiring terminations are made within the cavity **30** since the internal components and wiring terminations are not intended to be accessed by the subscriber. Preferably, however, the cover **40** is removably attached to the base **20** with the fasteners **60** so that a craftsperson dispatched from the service provider can access the cavity **30** to make any necessary repairs to the internal components and wiring terminations.

 The housing **10** further comprises a filter circuit **24** (FIG. 2) mounted on the inner surface **21** of the base **20** such that the filter circuit **24** is electrically insulated

and physically protected within the cavity **30** of the housing **10**. The filter circuit **24** may be any electronic circuit for separating voice and data signals. In the embodiments shown and described herein, the filter circuit **24** is a low pass (i.e., distributed) filter for passing only the voice signal of an asymmetrical digital subscriber line (“ADSL”). The filter circuit **24** is mounted on a printed circuit board **23** having at least a pair of input wire terminations and at least a pair of output wire terminations disposed thereon that are electrically connected to the filter circuit **24**. Preferably, the printed circuit board **23** is positioned on a recessed shelf **25** formed on the inner surface **21** of the base **20**. The shelf **25** is recessed relative to the inner surface **21** to provide additional space within the cavity **30** for the filter circuit **24**, while at the same time maintaining a relatively thin profile for the housing **10** when mounted on the wall plate **12**. The shelf **25** is positioned above the wall plate **12** when the housing **10** is attached to the mounting studs **11** so that the thickness of the shelf **25** does not cause the telephone **16** to extend outwardly from the wall plate **12** an undesirable distance. A plurality of wire terminating devices **26** are also provided on the inner surface **21** of the base **20**. As shown, wire terminating devices **26** are conventional screw terminals. However wire terminating devices **26** may be any suitable devices for establishing electrical continuity, such as insulation displacement contacts (“IDCs”), or may simply be solder points disposed on the inner surface **21** of the base **20**. Alternatively, the electrical connections may be made by soldering the ends of the wires directly to the wiring terminations provided on the printed circuit board **23**, or the printed circuit board **23** may be provided with wiring terminals.

A line cord **28** (FIG. 2) having a phone plug **29** attached at one end is routed through an S-shaped strain relief guide **27** affixed to the inner surface **21** of the base **20**. A generally U-shaped retaining rib **48** (FIG. 5) extends downwardly from the inner surface **41** of the cover **40** to retain the line cord **28** within the strain relief guide **27** when the cover **40** is secured on the base **20**. A portion of the line cord **28** and the phone plug **29** extend through an opening **31** formed through the base **20** to engage the phone jack **13** of the wall plate **12**. The line cord **28** and phone plug **29** may be replaced by an inextensible phone plug that protrudes outwardly from the base **20**. However, the use of the extensible line cord **28** and phone plug **29** permits the housing **10** to be utilized with both a wall plate **12** having a protruding phone jack **13** (as shown) and a wall plate having a recessed or flush-mounted phone jack. The opening **31** is preferably sized appropriately to permit any excess length of the line cord **28** to be coiled and easily stored adjacent the opening **31** and a first opening **44** formed through the cover **40**. As previously described, phone jack **13** may be an RJ-11 or RJ-14 style jack depending on whether the housing **10** is configured to service a single telephone line or two telephone lines, respectively. The phone plug **29** is a six position plug that is wired as necessary to complement the phone jack **13**. For example, the phone plug **29** is wired with only a single pair of tip and ring wires in positions 3 and 4 if the phone jack **13** is an RJ-11 style jack and is wired with a second pair of tip and ring wires in positions 2 and 5 if the phone jack **13** is an RJ-14 style jack.

The housing **10** further comprises a phone jack **32** and at least one auxiliary jack **34**, as will be described. The phone jack **32** is identical to the phone jack **13** of

the wall plate **12** and protrudes upwardly from the inner surface **21** of the base **20** through the first opening **44** formed through the cover **40**. Accordingly, the phone jack **32** has a recess **33** with at least a pair of contact wires disposed within the recess for transmitting plain old telephone service (“POTS”) voice signals. The phone jack

5 **32** receives the phone plug of the telephone **16** in the same manner as the phone jack **13** receives the phone plug **29** of the line cord **28** of the housing **10**, as previously described. The auxiliary jack **34** may be an additional phone jack for a second telephone line, or may be an additional phone jack for other telecommunications equipment, such as a facsimile machine or answering machine, on the same line as the

10 telephone **16**. The auxiliary jack **34** may also be a data jack for data communications, such as high speed Internet access. As shown and described herein, the housing **10** comprises both a pair of auxiliary jacks **34**, namely a secondary phone jack **36** and a digital subscriber line (“DSL”) jack **38** for high speed Internet access. The secondary phone jack **36** and the DSL jack **38** may be either an RJ-11 style jack or an RJ-14

15 style jack, as previously described. The secondary phone jack **36** is disposed on the inner surface **21** of the base **20** and is received within a relief **50** formed in the sidewall **49** of the cover **40**. The DSL jack **38** is likewise disposed on the inner surface **21** of the base **20** and is received within a relief **52** (FIG. 5) formed in the sidewall **49** of the cover **40** opposite the relief **50**.

20 The end of the line cord **28** opposite the phone plug **29** comprises at least one wire pair, and typically, comprises a first pair of tip and ring wires for a first telephone line and a second pair of tip and ring wires for a second telephone line. The wire pair(s) of the line cord **28** may be wired to the wire terminating devices **26** and

the filter circuit **24** in any suitable manner depending on the desired configuration of the housing **10**. For purposes of example only, and not by way of limitation, the subscriber may desire xDSL service on the first telephone line and POTS service on the second telephone line. In this instance, the housing **10** may be configured with

5 two telephone lines, with only the first telephone line passing through the filter circuit **24**. Thus, the tip and ring wires for the first telephone line and the second telephone line are electrically connected from the phone plug **29** to the line cord **28** and in turn to the wire terminating devices **26**. The tip and ring wires for the first telephone line are then electrically connected from the wire terminating devices **26** to the input wire

10 terminations of the filter circuit **24**. The output wire terminations of the filter circuit **24** are then electrically connected to both the phone jack **32** and the secondary phone jack **36**. The tip and ring wires for the first telephone line are also electrically connected from the wire terminating devices **26** directly to the DSL jack **38**. Finally, the tip and ring wires for the second telephone line are electrically connected from the

15 wire terminating devices **26** to the phone jack **32**, the secondary phone jack **36** and the DSL jack **38**. Accordingly, an unfiltered xDSL (i.e., voice and data) signal is delivered to DSL jack **38** while the filter circuit **24** delivers a filtered voice signal from the first telephone line to only the phone jack **32** and the secondary phone jack **36**. Additionally, an unfiltered POTS signal is delivered to the phone jack **32**, the

20 secondary phone jack **36**, and the DSL jack **38** on the second telephone line. The preceding example is only one of the many different possible configurations and wiring schemes that the housing **10** may have, and thus, should not be construed as limiting the invention in any manner. For example, another possible configuration

may have a second filter circuit for filtering the second telephone line in the same or a different manner.

The cover **40** comprises a pair of mounting studs **43** positioned over the holes **42** and retained between the outer surface **45** of the cover **40** and the fasteners **60**.

5 The mounting studs **43** engage elongated slots on the rear surface of the telephone **16** to removably attach the telephone **16** to the housing **10** in the same manner as the housing **10** is attached to the wall plate **12**. In addition to the pair of holes **42** and the first opening **44** described above, the cover **40** of the housing **10** has a second opening **46** formed therethrough adjacent the lower edge of the cover **40**. Together, the first
10 opening **44** and the second opening **46** define an upper viewing window and a lower viewing window opposite a pair of upper and lower slots **35** formed through the base **20** for receiving the mounting studs **11** of the wall plate **12**. The upper viewing window **44** and the lower viewing window **46** permit an installer, preferably the subscriber, to readily align the upper and lower slots **35** in the base **20** over the
15 mounting studs **11** of the wall plate **12**. Accordingly, it is unlikely that the housing **10** will be improperly seated on the wall plate **12**. If not properly seated, the housing **10** could unexpectedly detach from the wall plate **12** while the telephone **16** is positioned on the housing **10**, resulting in possible damage to the telephone **16**.

Preferably, yet another feature is provided to secure the housing **10** to the wall
20 plate **12**. As shown, the housing **10** further comprises a locking mechanism **70** partially disposed within cavity **30** between the base **20** and the cover **40**. In the embodiment illustrated in FIGS. 1-7, the locking mechanism **70** comprises an elongate slide lock **72** having a grip portion **71** adjacent one end and a narrower stop

portion 73 adjacent the other end. The slide lock 72 has a recess 74 formed in the upper surface thereof for a purpose to be described. The grip portion 71 protrudes through a relief 37 (FIG. 2) formed in the lip 39 of the base 20 and a corresponding relief 47 formed in the sidewall 49 of the cover 40. The locking mechanism 70

5 further comprises a pair of opposed guide ribs 76 (FIG. 2) extending upwardly from the inner surface 21 of the base 20. The stop portion 73 of the slide lock 72 is disposed between the guide ribs 76 so that the guide ribs 76 serve to guide the stop portion 73 therebetween. The locking mechanism 70 further comprises a retaining rib 78 (FIG. 5) extending downwardly from the inner surface 41 of the cover 40. The

10 retaining rib 78 is disposed between the guide ribs 76 over the recess 74 formed in the slide lock 72. The retaining rib 78 thereby serves to retain the slide lock 72 within the cavity 30 and the stop portion 73 between the guide ribs 76 when the cover 40 is secured on the base 20.

The slide lock 72 is shown in the unlocked position in FIG. 6. In the unlocked

15 position, the grip portion 71 of the slide lock 72 extends substantially outward from the housing 10 and the stop portion 73 does not extend substantially beneath the upper viewing window 44 of the cover 40. The slide lock 72 is shown in the locked position in FIG. 7. In the locked position, the grip portion 71 of the slide lock 72 is positioned within the relief 37 and the relief 47 substantially flush with the housing 10 and the

20 stop portion 73 extends substantially inward beneath the upper viewing window 44 of the cover 40. Accordingly, in the unlocked position the stop portion 73 of the slide lock 72 does not obstruct the upper slot 35 formed in the base 20 so that the housing 10 may be readily positioned over the mounting studs 11 on the wall plate 12. In the

locked position, however, the stop portion **73** obstructs the upper slot **35** so that the housing **10** cannot be removed from the wall plate **12** without first moving the slide lock **72** from the locked position to the unlocked position. The locking mechanism **70** may be located adjacent the lower viewing window **46** and utilized in conjunction
5 with the lower slot **35**. Alternatively, a locking mechanism **70** may be located adjacent each of the viewing windows **44**, **46** and utilized in conjunction with both the upper and lower slots **35**.

In operation, an installer or the subscriber removes the telephone **16** from the wall plate **12** by sliding the telephone **16** upwardly until the elongated slots on the
10 rear of the telephone **16** disengage from the mounting studs **11** on the wall plate **12**. The phone plug on the rear of the telephone **16** is then removed from the phone jack **13** on the wall plate **12** and the telephone **16** is set aside. The fully assembled housing **10** is next positioned over the wall plate **12** with the cover **40** secured to the base **20** and the slide lock **72** in the unlocked position. While observing the mounting studs
15 **11** through the upper viewing window **44** and the lower viewing window **46**, the slots **35** on the base **20** of the housing **10** are aligned with the mounting studs **11**. The housing **10** is then slid downwardly until the slots **35** engage the mounting studs **11** on the wall plate **12**. The slide lock **72** is then moved to the locked position to secure the housing **10** on the wall plate **12**. The phone plug **29** on the line cord **28** of the
20 housing **10** is then inserted into the phone jack **13**. The phone plug **29** may, however, be inserted prior to the housing **10** being installed onto the mounting studs of the wall plate **12**. In the configuration shown and described herein, a secondary phone plug (not shown) is inserted into the secondary phone jack **36**, a data plug (not shown) is

inserted into the DSL jack **38** and the phone plug on the rear of the telephone **16** is inserted into the phone jack **32**. The elongated slots on the rear of the telephone **16** are then aligned with the mounting studs **43** on the cover **40** of the housing **10** and the telephone **16** is slid downwardly until the elongated slots engage the mounting studs

5 **43**. Removal of the housing **10** is typically accomplished by reversing the order of the installation steps.

An alternative embodiment of a housing **100** for a distributed filter constructed in accordance with the invention is shown in FIGS. 8-14. The housing **100** functions in the same manner as the housing **10** and is similar in structure and construction

10 except that the upper and lower viewing windows **44**, **46** are removed and the locking mechanism **170** is relocated to the outer surface **145** of the cover **140**. As a result, the housing **100** is substantially more compact than the housing **10**, and thus, may be entirely hidden from view when a conventional wall-mount telephone **16** is attached to the housing **100**. FIG. 8 illustrates the manner in which the housing **100** is

15 removably mounted to a wall plate **12** having a pair of mounting studs **11** and a phone jack **13** of the type previously described. The phone plug **29** of the line cord **28** of the housing **100** is received within the phone jack **13** protruding outwardly from the front surface **14** of the wall plate **12**. The phone jack **13**, however, may also be recessed or flush-mounted with the front surface **14** of the wall plate **12**, as previously described.

20 The slots **35** (FIGS. 11 and 12) formed through the base **120** of the housing **100** engage the mounting studs **11** of the wall plate **12** to attach the housing **100** to the wall plate **12**, as previously described. FIG. 9 illustrates the manner in which the telephone **16** is removably mounted to the housing **100**. The phone plug **19** of the

line cord **18** of the telephone **16** is received within the phone jack **32** protruding outwardly from the outer surface **145** of the cover **140**. The slots (not shown) formed in the rear surface of the telephone **16** engage the mounting studs **43** of the cover **140** to attach the telephone **16** to the housing **100**, as previously described.

5 The housing **100** is shown in greater detail in FIGS. 10-14. As shown and described herein, the housing **100** comprises a base **120** and a cover **140** attached to the base **120** such that the base **120** and the cover **140** define an internal cavity **130** (FIG. 14) therebetween. As previously mentioned, the base **120** and the cover **140** are substantially the same in function, structure and construction as the base **20** and the
10 cover **40** previously described and the cover **140** is secured to the base **120** in substantially the same manner. Accordingly, only the differences between the housing **100** and the housing **10** will be described hereinafter.

 The housing **100** further comprises a filter circuit **124** (FIG. 12) mounted on the inner surface **121** of the base **120** such that the filter circuit **124** is electrically
15 insulated and physically protected within the cavity **130** of the housing **100**. The filter circuit **124** may be any electronic circuit for separating voice and data signals. Preferably, the filter circuit **124** is a low pass (i.e., distributed) filter for passing only the voice signal of an asymmetrical digital subscriber line ("ADSL"). The filter circuit **124** is mounted on a printed circuit board **123** having at least a pair of input
20 wire terminations **126a** and at least a pair of output wire terminations **126b** disposed thereon that are electrically connected to the filter circuit **124**. Preferably, the input and output wire terminations **126a**, **126b** are solder points disposed on the printed circuit board **123**. The printed circuit board **123** is positioned on the inner surface **121**

of the base **120** between a plurality of support posts **125** for a purpose to be described.

The line cord is routed through an S-shaped strain relief guide **127** affixed to the inner surface **121** of the base **120**. A generally U-shaped retaining rib **148** (FIG. 13)

extends downwardly from the inner surface **141** of the cover **140** to retain the line

5 cord **28** within the strain relief guide **127** when the cover **140** is secured on the base **120**. A portion of the line cord **28** and the phone plug **29** extend through an opening **131** formed through the base **120** to engage the phone jack **13** of the wall plate **12**.

The line cord **28** and phone plug **29** may be replaced by an inextensible phone plug that protrudes outwardly from the base **120**. However, the use of the extensible line

10 cord **28** and phone plug **29** permits the housing **100** to be utilized with both a wall plate **12** having a protruding phone jack **13** (as shown) and a wall plate having a recessed or flush-mounted phone jack. The opening **131** is formed in a recess **131a** (FIG. 11) to allow the phone plug **29** and the line cord **28** to extend from the cavity

130. Recess **131a** is sized appropriately to allow clearance for the phone jack **13** and

15 the phone plug **29** within the recess **131a** when the housing **100** is fully installed onto the wall plate **12**. The excess length of the line cord **28** is naturally retracted into the

cavity **130** defined by the base **120** and the cover **140** as a result of the elasticity of the line cord, the clearance provided within the cavity **130** and the retention force exerted by the strain relief guide **127**. In FIG. 12, the dashed line representation indicates the

20 position of the line cord **28** when extended to make connection to the phone jack **13** on the wall plate **12** and the solid line representation indicates the position of the line cord **28** when retracted into the cavity **130** when the housing **100** is fully installed onto the wall plate **12**.

As previously described, phone jack **13** may be an RJ-11 or RJ-14 style jack depending on whether the housing **100** is configured to service a single telephone line or two telephone lines, respectively, and the phone plug **29** is a six position plug that is wired as necessary to complement the phone jack **13**. The housing **100** further

5 comprises a phone jack **32**, a secondary phone jack **36** and a DSL jack **38**, as previously described. The phone jack **32** is mounted to and protrudes outwardly from the cover **140** of the housing **100**. The secondary phone jack **36** is disposed on the printed circuit board **123** of the base **120** and is received within a relief **50** formed in the sidewall **149** of the cover **140** (FIG. 13). The DSL jack **38** is likewise disposed on

10 the printed circuit board **123** of the base **120** and is received within a relief **52** (FIG. 13) formed in the sidewall **149** of the cover **140** opposite the relief **50**. Preferably, the secondary phone jack **36** and the DSL jack **38** are mounted directly on the printed circuit board **123** to minimize the space occupied by the filter circuit **124**, the secondary phone jack **36** and the DSL jack **38** within the cavity **130** defined by the

15 base **120** and the cover **140**. In addition, mounting the secondary phone jack **36** and the DSL jack **38** on the circuit board **123** with the filter circuit **124** eliminates the wiring terminations to and from the secondary phone jack **36** and the DSL jack **38**, thereby further reducing the space requirements. For purposes of example only, and not by way of limitation, the subscriber may desire xDSL service on both the first

20 telephone line and the second telephone line. In this instance, the housing **100** may be configured with two telephone lines and the filter circuit **124** may comprise a first filter circuit **124a** for the first telephone line and a second filter circuit **124b** for the second telephone line. As shown herein, the end of the line cord **28** opposite the

phone plug **29** comprises a first pair of tip and ring wires for a first telephone line and a second pair of tip and ring wires for a second telephone line. The wire pairs of the line cord **28** are wired to the input wire terminations **126a** on the printed circuit board **123** such that the first telephone line is electrically connected to both the first line of the DSL jack **38** and the first filter circuit **124a**, while the second telephone line is electrically connected to both the second line of the DSL jack **38** and the input of the second filter circuit **124b**. The output of the first filter circuit **124a** and the output of the second filter circuit **124b** are electrically connected on the printed circuit board **123** to both the secondary phone jack **36** and the output wire terminations **126b**. The output wire terminations **126b** are in turn electrically connected to the phone jack **32**. Thus, from the phone plug **29**, the first telephone line and the second telephone line are electrically connected and deliver unfiltered xDSL (voice and data) signals to the DSL jack **38** and filtered POTS signals to the phone jack **32** and the secondary phone jack **36**. The preceding example is only one of the many different possible configurations and wiring schemes that the housing **100** may have, and thus, should not be construed as limiting the invention in any manner. For example, another possible configuration may have only a first filter circuit for filtering only the first telephone line in the same or a different manner.

The housing **100** further comprises a locking mechanism **170** (FIG. 14) partially disposed within cavity **130** between the base **120** and the cover **140**. In the embodiment illustrated in FIGS. 8-14, the locking mechanism **170** comprises a generally rectilinear push-button lock **172** having a stop portion **171** adjacent one end and an actuator portion **173** adjacent the other end. The actuator portion **173**

protrudes through an opening **147** formed in the cover **140** and is supported by a pair of guide ribs **174** (FIG. 13) extending downwardly from the inner surface **141** of the cover **140**. The locking mechanism **170** further comprises a pair of opposed retaining clips **176** (FIG. 12) extending upwardly from the inner surface **121** of the base **120**.

- 5 The stop portion **171** of the slide lock **172** comprises a pair of opposed retaining posts **178** (FIG. 13) that engage the retaining clips **176** to secure the push-button lock **172** to the base **120**, as will be described. The locking mechanism **170** may be located adjacent and utilized in conjunction with the lower slot **35**. Alternatively, a locking mechanism **170** may be located adjacent each and utilized in conjunction with both
- 10 the upper and lower slots **35**.

FIG. 14 illustrates the sequence in which the housing **100** is secured to the wall plate **12** utilizing the push-button lock **172**. As manufactured and assembled (left-hand view), the retaining posts **178** of the stop portion **171** of the push-button lock **172** are secured to the retaining clips **176** on the base **120**. Accordingly, the

15 actuating portion **173** of the push-button lock **172** is substantially flush with the outer surface **145** of the cover **140**. During installation, the upper mounting stud **11** of the wall plate **12** is received in the upper slot **35** of the base **120** and the retaining posts **178** are forced out of engagement with the retaining clips **176**. As a result, the

actuating portion **173** protrudes outwardly from the outer surface **145** of the cover **140**

20 to the unlocked position. Once the housing **100** is slid downwardly over the mounting studs **11** of the wall plate **12**, the stop portion **171** of the push-button lock **172** is no longer obstructed by the upper mounting stud **11**. Thereafter, the actuating portion **173** can be depressed so that the retaining posts **178** are once again secured in

the retaining clips **176** on the base **120** of the housing **100**. In the locked position (right-hand view), the housing **100** cannot be slid upwardly relative to the wall plate **12** without first moving the actuating portion **173** from the locked position to the unlocked position. Accordingly, the housing **100** is securely attached to the wall plate **12**, yet is easily removable (i.e., by pulling out the actuator portion **173**) without the use of a tool of any kind.

In operation, an installer or the subscriber removes the telephone **16** from the wall plate **12** by sliding the telephone **16** upwardly until the elongated slots on the rear of the telephone **16** disengage from the mounting studs **11** on the wall plate **12**.

The phone plug on the rear of the telephone **16** is then removed from the phone jack **13** on the wall plate **12** and the telephone **16** is set aside. The phone plug **29** on the line cord **28** of the housing **100** is then inserted into the phone jack **13**. The fully assembled housing **100** is next positioned over the wall plate **12** with the cover **140** secured to the base **120** and the actuating portion **173** of the push-button lock **172** depressed. The slots **35** on the base **120** of the housing **100** are aligned with the mounting studs **11** and the housing **100** is positioned on the wall plate **12**. As the upper slot **35** engages the upper mounting stud **11**, the push-button lock **172** is forced outwardly to the unlocked position. The housing **100** is then slid downwardly until the slots **35** engage the mounting studs **11**. Once the mounting studs **11** are properly seated in the slots **35**, the actuating portion **173** of the push-button lock **172** is depressed again to secure the housing **100** on the wall plate **12**. In the configuration shown and described herein, a secondary phone plug (not shown) is inserted into the secondary phone jack **36**, a data plug (not shown) is inserted into the DSL jack **38** and

the phone plug **19** on the rear of the telephone **16** is inserted into the phone jack **32**.

The elongated slots on the rear of the telephone **16** are then aligned with the mounting studs **43** on the cover **140** of the housing **100** and the telephone **16** is slid downwardly until the elongated slots engage the mounting studs **43**. Removal of the housing **100**

5 is typically accomplished by reversing the order of the installation steps, with the exception that the actuating portion **173** must be pulled outwardly to disengage the push-button lock **172** before the housing **100** is slid upwardly to disengage the slots **35** from the mounting studs **11** on the wall plate **12**.

10 It is to be understood that the foregoing description is exemplary only and, as such, is intended to provide further explanation of the invention without limiting the scope of the invention in any manner. Obviously, many alternative embodiments and configurations of the invention are within the ordinary skill of one knowledgeable in the art. It will be readily apparent to those skilled in the art that the invention is not
15 limited to the specific embodiments shown and described herein, but is susceptible to various changes without departing from the scope of invention. Thus, it is intended that the appended claims encompass any and all alternative embodiments of the invention not disclosed herein that are within the ordinary skill of a person knowledgeable in the art.